

Digital Information System Design Using the Collaborative Filtering Method at A Cafe in Bandung

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Abstract

A culinary SME in Bandung encounters efficiency issues stemming from a manual ordering process that is sluggish and susceptible to inaccuracies. Customers struggle to find popular menu items. This study aims to develop a web-based digital information system that employs Collaborative Filtering techniques to improve ordering efficiency and offer recommendations for top-selling foods. The system development uses the Waterfall model and a descriptive qualitative research methodology, and the system is built with the Laravel framework. The outcome is a working web application for ordering, reservations, and menu suggestions, accompanied by an administrative dashboard for real-time oversight. According to Black-Box testing, all system functionalities perform as anticipated. This system aims to optimize processes, minimize errors, and improve the customer experience at a café in Bandung.

Keywords: *Information System, Collaborative Filtering, Website, Digital Ordering*

Introduction

The advancement of information technology has propelled digital transformation across numerous sectors, including the culinary industry. Digitalization is a crucial element in improving operational efficiency and corporate competitiveness in the context of Industry 4.0 (Fu & Ma, 2021). The trend of digitization among micro, small, and medium enterprises (MSMEs) in Indonesia has been marked by substantial growth. As of 2023, over 25.42 million MSMEs were integrated into the digital ecosystem, with this figure on the ascent (Devi et al., 2023; Muhammad Ridho Fasya et al., 2025).

The culinary sector, encompassing restaurants and cafés, has had substantial benefits. Nevertheless, many business operators have not yet fully adopted digital technologies, particularly in order processing and customer data management. (Jaclyn Tjuarsa et al., 2023) The absence of digitalization adversely affects service efficiency and the customer experience. (Saputra et al., 2025)

For example, a culinary MSME continues to employ manual techniques for order documentation, such as inscribing them on paper. Menus are accessible only via a scanned PDF file with a barcode. This scenario presents multiple issues, including the potential loss of order documents, service delays, and recording inaccuracies that may adversely affect the café. (Sri Sutjiningtyas et al., 2022)

Moreover, new customers frequently struggle to recognize popular menu items that are commonly ordered. Consequently, a web-based digital information system is necessary, which not only streamlines ordering and reservations but also offers menu recommendations via Collaborative Filtering techniques.

Digital Information System

(Papadakis et al., 2022) define a digital information system as a computer-based framework that facilitates the management of data and business operations, enhancing efficiency and accessibility. This method automates manual tasks and enhances the precision of record-keeping.

Website as a Service Platform

(Xia et al., 2022) assert that a website can function as an efficient service medium in the culinary sector by providing menu information, enabling ordering, and enhancing online marketing outreach.

Filtration

Filtering is a technique for sifting through information to present pertinent data based on user requirements (Ko et al., 2022).

Collaborative Filtering

(Hui et al., 2022) assert that Collaborative Filtering is a recommendation technique based on the preferences of users who exhibit similar patterns. This strategy is used to offer recommendations for popular menu items that patrons commonly select.

This research seeks to develop a web-based digital information system that includes ordering, reservations, an administrative dashboard, and the implementation of Collaborative Filtering techniques for menu recommendations. The solution is expected to improve operating efficiency, minimize errors, and deliver a better customer experience.

Research Method

This study utilizes a descriptive qualitative methodology to precisely illustrate the existing circumstances and system requirements at a cafe in Bandung. The study employs many ways to collect pertinent data. Initially, an observation is conducted to analyze the manual ordering process, yielding insights into its efficacy and potential shortcomings. Secondly, interviews are conducted with both personnel and clients to gather their experiences and expectations concerning the ordering system. A literature review is conducted, focusing on journals and relevant literature on information systems, MSME digitalization, and Collaborative Filtering techniques.

The research employs the Waterfall approach for system development, which progresses through multiple stages. The process commences with requirement analysis, during which the café's specific needs are ascertained. This is succeeded by system design, which includes architecture, database structure, and user interface/user experience (UI/UX) factors. The last phase is implementation, during which coding is done with Laravel and MySQL, resulting in a functional system. Post-implementation, the system undergoes comprehensive Black-box testing to verify that all functionalities perform as expected. Ultimately, maintenance techniques will be implemented to guarantee the system's continued efficacy and responsiveness to user requirements over time. This holistic strategy aims to improve operational efficiency, minimize errors, and ultimately deliver a better customer experience at a café in Bandung.

Result and Discussion

Observations and interviews with staff at a café in Bandung indicate that one of the café's ordering methods remains manual and paper-based, which poses risks of loss and recording inaccuracies. The menu is available only in PDF format, making it impractical for customers. A web-based digital information system will be developed, incorporating functionalities for online ordering, reservations, Collaborative Filtering-based menu recommendations, and an administrative dashboard for data administration.

A. System Design (Design)

The use case diagram of the developed information system features three actors: Customer, Admin, and Owner. Each actor possesses distinct access privileges, as demonstrated in the subsequent image:

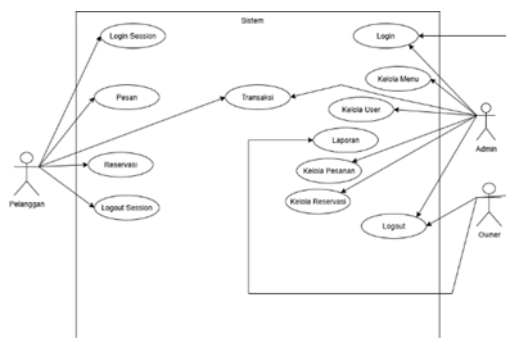


Figure 1. Use Case Diagram

B. Activity Diagram

The Activity Diagram depicts the transitions between activities within a system. The procedure begins with the user, who then goes to the subsequent view. The user will choose one option from the main menu. The system will then display an additional page for the selected category.

a. Activity Diagram Login

Describes the user flow from entering login data to system validation.

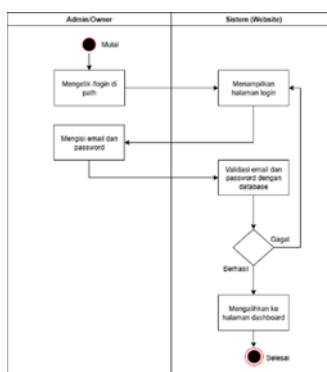


Figure 2. Login Activity Diagram

b. Manage Orders Activity Diagram

Shows admin activity managing orders.

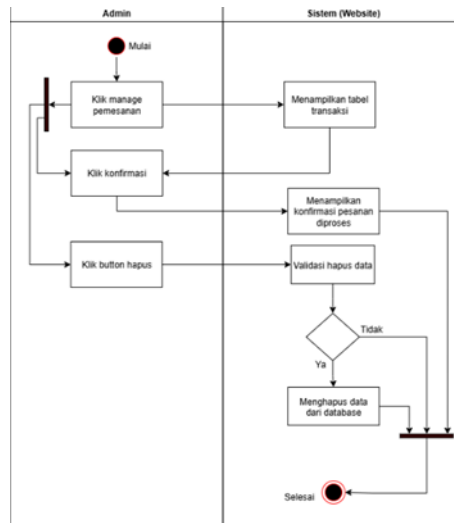


Figure 3. Activity Diagram Manage Orders

c. Transaction Activity Diagram

Explains the flow of customer and admin transactions through the system

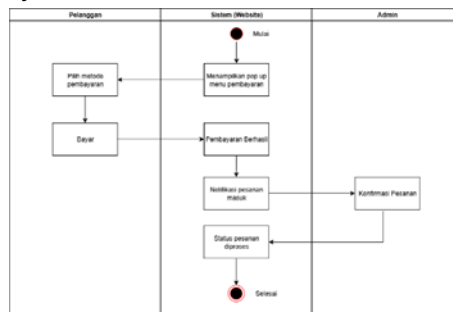


Figure 4. Transaction Activity Diagram

C. Class Diagram

This Class Diagram describes the objects that make up a system and the relationships between object classes that occur within the system.

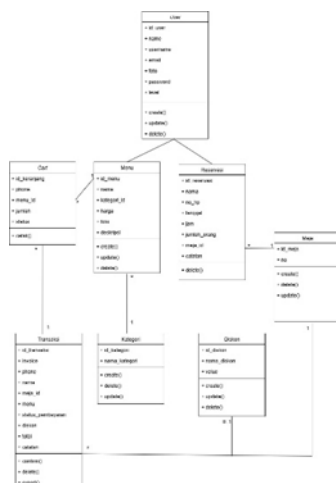


Figure 5. Class Diagram

D. Database Implementation

The database in this information system is implemented using MySQL with several main tables, namely:

Table	Action	Rows	Type	Collation	Size	Overhead
cart	Browse Structure Search Insert Empty Drop	18	InnoDB	utf8mb4_unicode_ci	16.0 K B	-
diskon	Browse Structure Search Insert Empty Drop	3	InnoDB	utf8mb4_unicode_ci	16.0 K B	-
failed_jobs	Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	32.0 K B	-
kategori	Browse Structure Search Insert Empty Drop	2	InnoDB	utf8mb4_unicode_ci	16.0 K B	-
maja	Browse Structure Search Insert Empty Drop	9	InnoDB	utf8mb4_unicode_ci	16.0 K B	-
menu	Browse Structure Search Insert Empty Drop	14	InnoDB	utf8mb4_unicode_ci	16.0 K B	-
migrations	Browse Structure Search Insert Empty Drop	12	InnoDB	utf8mb4_unicode_ci	16.0 K B	-
password_resets	Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	32.0 K B	-
personal_access_tokens	Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_unicode_ci	48.0 K B	-
reservasi	Browse Structure Search Insert Empty Drop	2	InnoDB	utf8mb4_unicode_ci	16.0 K B	-
transaksi	Browse Structure Search Insert Empty Drop	6	InnoDB	utf8mb4_unicode_ci	16.0 K B	-
users	Browse Structure Search Insert Empty Drop	2	InnoDB	utf8mb4_unicode_ci	32.0 K B	-
12 tables	Sum	60	InnoDB	utf8mb4_general_ci	272.0 K B	0 B

Figure 6. Database Table

E. Interface Implementation

Following the comprehensive analysis and planning phases, the next step is implementation, during which the system is deployed and prepared for use. This document presents the implementation of the interfaces for the website-based café's pages within the digital information system. Each page is crafted to facilitate user access to the accessible functionalities.

a. Login Page

The Login page facilitates system access. Users are required to input the email address and password they registered

earlier. If you do not have an account, this page includes a button or link to the registration page.

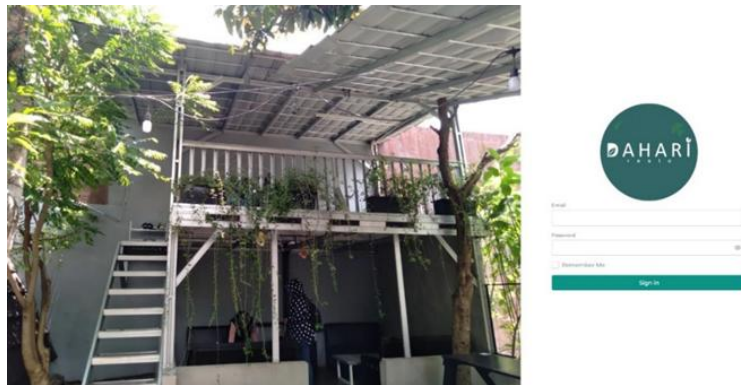


Figure 7. Login Page

b. Dashboard Page

The Login page facilitates system access. Users are required to input the email address and password they registered earlier. If you do not have an account, this page includes a button or link to the registration page.

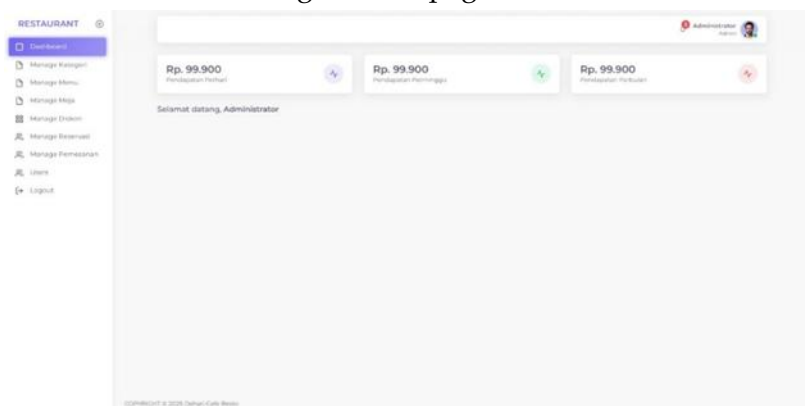
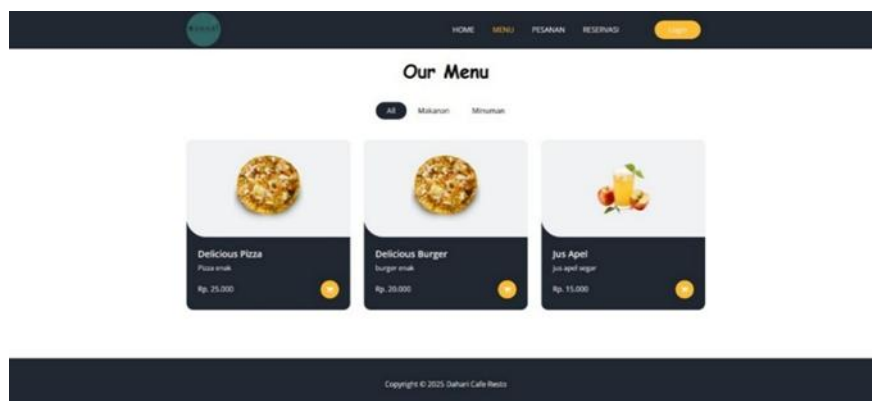


Figure 8. Dashboard page

c. Menu Page

Users can view products and navigate using buttons, add items directly to the cart, and proceed to checkout.



Gambar 9. Halaman Menu

d. Checkout Page

The Checkout page presents a compilation of items included in the shopping cart. Users may add remarks, select a table, review the total cost, or proceed to payment.

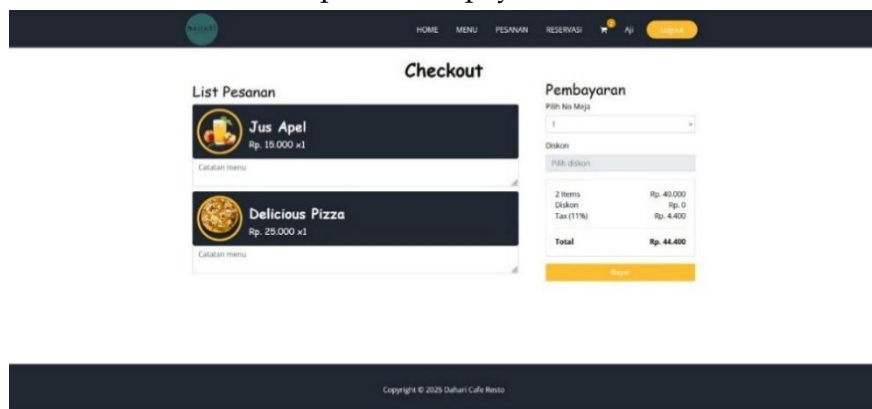


Figure 10. Checkout Page

e. Manage Orders Page

Users can get a list of their prior orders on the Manage Orders page. Each order presents product specifications, total cost, date, and confirmation of order processing status.

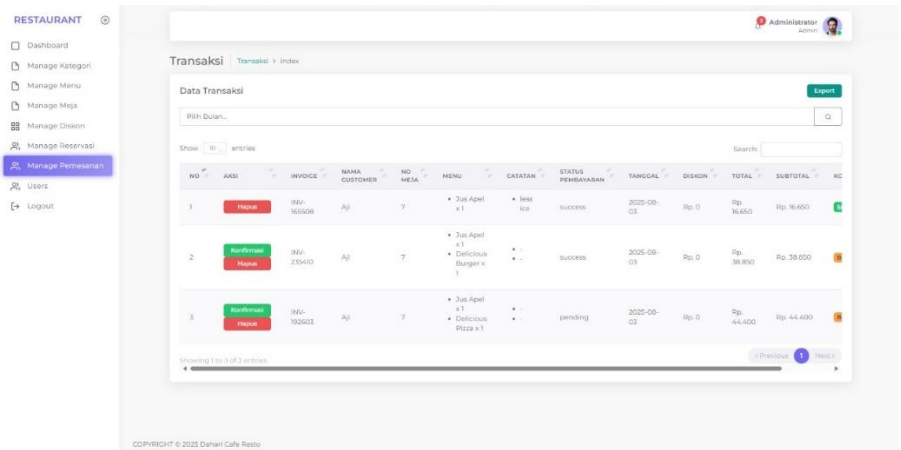


Figure 11. Manage Orders

F. System Testing

This study conducted a trial using a black-box approach to assess the feature's functionality.

Table 1. System Testing

No	Test Items	Test Results	Test Input	Expected results	Information
1	Order Menu	Successfully moved to Orders page	Click on orders in the menu bar	Successfully moved to Orders page	[X] Succeed [] Fail
2	Reservation Menu	Successfully moved to the Reservation page	Click on reservation in the menu bar	Successfully moved to the Reservation page	[X] Succeed [] Fail
3	Basket	Successfully moved to the cart page	Click the cart button after ordering	Successfully moved to the cart page	[X] Success [] Failed
4	Checkout	Successfully moved to checkout page	Click the checkout button on	Successfully moved to checkout page	[X] Success [] Failed

			the cart page		
5	Pay	Displaying payment pop up	Click the pay button on the checkout page	Displaying payment pop up	[X] Success [] Failed
6	Valid Transaction	Customer paid for order and payment status is successful	Select payment method from payment pop up then pay	Customer paid for order and payment status is successful	[X] Success [] Failed
7	Login Admin/Owner valid	Login successfully	The email and password columns are filled in.	Successfully logged in and moved to the dashboard	[X] Success [] Failed
8	Manage Reservations	Successfully deleted reservation data	Press the delete button	Successfully deleted reservation data	[X] Success [] Failed
9	Manage Orders	Successfully confirm incoming order and order status becomes processed, delete order data	Press the confirm button, press the delete button	Successfully confirm incoming order and order status becomes processed, delete order data	[X] Success [] Failed

Cocclusion

This study effectively developed a web-based information system for a café in Bandung, incorporating facilities for ordering, reservations, an

admin dashboard, and menu recommendations, using the Collaborative Filtering approach. The test findings indicated that the system met the required criteria, enhancing operational efficiency, minimizing recording errors, and delivering an improved customer experience. Several recommendations might be offered for future growth. The efficacy of the Collaborative Filtering approach can be improved by moving beyond merely showcasing best-selling products to developing a more personalized recommendation system tailored to each user's order history. Secondly, incorporating more extensive capabilities, such as raw material inventory management and personnel oversight, would render this system a comprehensive solution for operations at a café in Bandung. The integration of payment methods at the cashier and on the website can enhance flexibility for clients during purchases and aid those unable to transact digitally.

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